明新科技大學　九十三學年度四年制轉學生入學測驗　試題紙

考試科目：微積分　系別：工學院　年級：二　

＊作答前，請先核對系別與考試科目是否正確！

准考證號碼：□□□□□□□□

（請考生自行填寫）

1. Find the following Limit, if it exists.

(1) $\lim\limits_{t\to 9}\dfrac{9-t}{3-\sqrt{t}}=?$　(2) $\lim\limits_{x\to 1}\left(\dfrac{1}{\ell nx}-\dfrac{1}{x-1}\right)=?$　(3) $\lim\limits_{x\to\infty}\left(\sqrt{x^2+5x}-x\right)=?$

2. Find the derivative $y'=\dfrac{dy}{dx}=?$

(1) $y=\sqrt[3]{x^2}+2\sqrt{x^3}$

(2) $y=\tan^2\left(x^3\right)$

(3) $y=\ell n\left(x^2+y^2\right)$

3. Find the inflection points and local extremum values of the curve $y=x^4-4x^3$.

4. Find the following integrals.

(1) $\int_0^1\left(1-2x-3x^2\right)dx=?$

(2) $\int_0^4\sqrt{2x+1}dx=?$

(3) $\int\sin^4 x dx=?$

(4) $\int x^2e^x dx=?$

(5) $\int\dfrac{x^2+2x-1}{2x^3+3x^2-2x}dx=?$

5. Find the volume of the solid by rotating the region bounded by $y=x-x^2$ and $y=0$ about the line $x=2$

6. $f(x,y,z)=e^{xy}\ell nz$, find $f_x+f_y+f_z=?$

7. Find the local maximum and minimum values and saddle points of

$f(x,y)=x^4+y^4-4xy+1$

8. Find the radius of convergence and interval of convergence of the series $\sum\limits_{n=1}^{\infty}\dfrac{x^n}{n}$.